

10th pleasant weather prevailed. During a great portion of the second decade of the month a barometric depression occupied the middle Plateau region, causing high southwest winds and heavy rain, and snow in the mountains. Warnings of high winds and a decided fall in temperature were issued on the 12th. A succession of storms marked the last decade of the month.—*A. G. McAdie, Professor and District Forecaster.*

PORTLAND FORECAST DISTRICT.

The special feature of the month in the North Pacific States and Idaho was a cold spell during the second decade. During the first two or three days of this period high northeast winds and snow prevailed. Warnings were ordered for three storms and were justified in each instance. Cold-wave warnings were ordered in southeastern Idaho on the 12th and were justified.—*E. A. Beals, District Forecaster.*

RIVERS AND FLOODS.

During the month three periods of heavy rains were followed by floods in the watersheds affected. The first district visited was the southeast on the 18th and 19th, and by the 20th and 21st flood stages were general, except in the Carolinas and northeastern Georgia, where the rivers were not above the danger lines as a rule. The usual warnings were issued in all cases.

The flood in the Ocmulgee River, while not at all unusual as far as the actual stages of water were concerned, was nevertheless a very trying one from the fact that it was the fourth in about four months, and the second within a week. The warnings, of course, enabled citizens to remove or protect portable property, but damage to fixed improvements could not be prevented.

The frequent occurrence of these floods has determined the commercial and agricultural interests in the vicinity of Macon, Ga., to protect themselves from further loss, and preliminary arrangements are in progress for the construction of a substantial levee to extend southward from Macon for a distance of about five miles.

The Flint River rise was not pronounced, but in the Chattahoochee danger-line stages were common, although no great damage resulted.

In the watershed of the Alabama River the floods were quite severe with stages from 3 to 8 feet above the danger lines in the Coosa and Tallapoosa rivers, and 15 feet above in the Alabama. Preliminary warnings had been issued on the 15th on account of the heavy rains of the 14th over the northern portions of Georgia and Alabama, and, as heavy rains were again falling, additional warnings were sent out on the 19th, owners of property subject to overflow being advised to remove or protect the same. Railroad repair trains were immediately dispatched to points exposed to floods, live stock was driven from the bottoms, and goods and merchandise were removed from storehouses and basements that were afterwards flooded. The warnings were accurate in every detail and were especially commended by the press and all others interested. The conditions were very similar over the Black Warrior and lower Tombigbee rivers; stages from 15 to 20 feet above the danger lines were forecast, with excellent verification, and the warnings were instrumental in saving a large amount of property. Additional warnings became necessary on the 28th and 29th for continued high stages that persisted for several days after the end of the month. The flood waters covered the lowlands along the Black Warrior, and those along the Tombigbee for a distance of 25 miles above Demopolis, Ala. Near the confluence of the two rivers the water extended five miles beyond the river bed, all steamboat landings were submerged, and flat-

boats were used for transferring freight from the steamboats to the higher lands. To the lumber and milling interests, however, the floods were a distinct benefit, as these were enabled to move timber that had been cut for the market.

The floods in southeastern Mississippi were also of decided proportions. Stages at the river stations were as follows:

Station.	River.	Stage.	Danger line.
Hattiesburg, Miss.	Leaf.....	20.5	20
Enterprise, Miss.	Chickasawhay...	29.4	18
Shubuta, Miss.	Chickasawhay...	39.6	25
Merrill, Miss.	Pascagoula.....	21.7	20
Jackson, Miss.	Pearl.....	29.6	20
Columbia, Miss.	Pearl.....	23.0	14

Warnings were first issued on the 19th, and were supplemented by others whenever necessary. The stages forecast were reached within a fraction of a foot, and no reports of serious damage have been received.

The moderate floods of the last week of the month in the interior rivers of Ohio were due to the melting of the large quantity of accumulated snow that had fallen earlier in the month, assisted by a fair rainfall on the 25th and 26th. Some lowlands were overflowed, but no serious damage was reported.

The accuracy of the warnings that were issued for this flood has demonstrated that flood forecasts for the smaller rivers of Ohio can be made with gratifying exactness. The single disturbing factor was the uncertainty as to the weight that should be given to the melted snow; the usual estimates made from measurements of unmelted snow are often very misleading, and for precise work it is essential that the water equivalent of accumulated snowfall be determined at frequent intervals by exact measurements.

The rises in the Mississippi and Ohio rivers were caused by the heavy rains of the 25th and 26th, and of the 29th and 30th, and were still in progress at the end of the month. They will be described in the MONTHLY WEATHER REVIEW for April, 1906.

It has been ascertained from press reports that the melting snow floods in the rivers of Wyoming were much more severe than usual, resulting in considerable damage to railroads, etc., and great losses to stockmen. No river and flood service is maintained in Wyoming.

The California rains from the 20th to the 26th, inclusive, were followed by steadily rising waters over the Sacramento and San Joaquin watersheds. To the rain waters were added those coming from the melting of the deep snows on the mountains, causing destructive floods in many localities. The stages reached were not exceptionally high, but the resulting damage was widespread, without, however, any special instances of unusual character, except the complete interruption of railroad traffic for some time in southern California. The levees, with but one or two unimportant exceptions, remained intact. Warnings of the dangerous character of the floods were issued on the 23d, 24th, and 26th.

At the end of the month the rivers were practically free from ice except the Mississippi from Dubuque northward and the rivers of northern New England. The upper Missouri opened during the last few days of the month.

The highest and lowest water, mean stage, and monthly range at 307 river stations are given in Table VI. Hydrographs for typical points on seven principal rivers are shown on Chart I. The stations selected for charting are Keokuk, St. Louis, Memphis, Vicksburg, and New Orleans, on the Mississippi; Cincinnati and Cairo, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.—*H. C. Frankenfield, Professor of Meteorology.*